

IN THE CLAIMS

Please amend the claims as follows.

- 1-2. (Canceled)
3. (Currently Amended) A computer-implemented method comprising:
identifying a candidate reuse region of a software program;
determining an input set for the candidate reuse region, wherein the input set comprises a plurality of input registers for storing input values of the candidate reuse region;
instrumenting the software program to, when executed, ~~profile~~ sample set-values for the input set, wherein each set-value comprises an input register value for each of the plurality of input registers, wherein during the execution, the sampling is performed every S occurrences of the set-values, and wherein S is an integer greater than 1;
for each set-value, combining each of the input register values into a single value; and
executing the instrumented software, wherein the executing includes tracking a number of times a set-value is encountered.
4. (Original) The computer-implemented method of claim 3 wherein combining comprises:
folding each of the input register values to create folded values; and
concatenating the folded values.
5. (Canceled)
6. (Currently Amended) The computer-implemented method of claim ~~[[5]]~~ 3 wherein the input-set comprises a plurality of input registers, and each set-value comprises an input register value for each of the plurality of input registers, and wherein the instrumenting includes, further comprises:
inserting instructions into the software program which, when executed, will combine each of the input register values into a single value; and

- inserting instructions into the software program which, when executed, will index into a data structure of profile indicators using the single value.
7. (Currently Amended) The computer implemented method of claim [[5]] 3, wherein the instrumenting includes ~~further comprises~~ inserting instructions to profile the top N occurring set-values, where N is chosen as a function of an expected number of reuse instances.
 8. (Previously Presented) The computer-implemented method of claim 3 further comprising selecting the candidate reuse region as a computation reuse region.
 9. (Currently Amended) A machine readable medium including instructions for a method of profiling software, the method comprising:
identifying a candidate reuse region of the software;
determining an input set for the candidate reuse region, wherein the input set comprises a plurality of input registers;
instrumenting the software to ~~profile~~, when executed, sample set-values for the input set, wherein each set-value comprises an input register value for each of the plurality of input registers; for each set-value, combining each of the input register values into a single value, and wherein during the execution, the sampling is performed every S occurrences of the set-values, and wherein the sampling is not performed for every occurrence of the set-values; and
executing the instrumented software, wherein the executing includes tracking a number of times a set-value is encountered.
 10. (Canceled)
 11. (Currently Amended) A computer-implemented method comprising:
determining whether a software program region is a computation reuse region, wherein the determining includes,
periodically sampling a set of registers to obtain register values, wherein the register values are input values of a the software program region;

determining an occurrence frequency of the register values;
combining the register values into a single set-value; and
storing the occurrence frequency and the single set-value in a data structure.

12. (Currently Amended) The computer-implemented method of claim 11, wherein the periodically sampling ~~comprises~~ includes sampling a plurality of registers to obtain a set-value every S occurrences of the software program region ~~a candidate reuse region~~, ~~where~~ wherein S is a sampling period, wherein S is greater than 1, and wherein S is chosen so that a statistically valid number of registers are sampled.
13. (Original) The computer-implemented method of claim 12 further comprising:
identifying a group of control equivalent candidate region entries and candidate load instructions;
inserting instructions prior to the group, wherein the instructions set a predicate register every S occurrences; and
inserting profiling instructions at each of the control equivalent candidate region entries and candidate load instructions, wherein the profiling instructions are predicated on the predicate register.
14. (Currently Amended) The computer-implemented method of claim 12, wherein the storing ~~comprises~~ includes,
accessing a record in the data structure as a function of the set-value; and
incrementing a profile indicator at the record.
15. (Currently Amended) The computer-implemented method of claim 12, wherein the periodically sampling further ~~comprises~~ includes sampling set-values in the plurality of registers at the beginning of a candidate reuse region, the plurality of registers being input registers to the candidate reuse region.
16. (Currently Amended) A computer-implemented method comprising:
identifying a candidate load instruction in a software program;

- instrumenting the software program to, when executed, sample a location-value every S occurrences of the candidate load instruction, wherein S is an integer greater than 1;
- storing an occurrence frequency of the location-value[s] into a data structure; and
- executing the software program.
17. (Currently Amended) The computer-implemented method of claim 16, wherein the instrumenting ~~comprises~~ includes,
- inserting instructions in the software program to count a number of times the location-value is sampled; and
- inserting instructions in the software program to keep track of top location-values.
18. (Previously Presented) The computer-implemented method of claim 16 further comprising:
- identifying a group of control equivalent candidate region entries and candidate load instructions in the software program;
- inserting instructions in the software program prior to the group, wherein the instructions set a predicate register every S occurrences; and
- inserting profiling instructions in the software program at each of the control equivalent candidate region entries and candidate load instructions, wherein the profiling instructions are predicated on the predicated register.
19. (Original) The computer-implemented method of claim 17 wherein the candidate region includes a plurality of candidate load instructions, each of the plurality of load instructions being predicated on a common predicate register.
20. (Original) The computer-implemented method of claim 17 wherein inserting instructions to keep track of top location-values includes inserting sampling instructions configured to profile the top N occurrences of location-values, where N is an integer.
21. (Currently Amended) A machine readable medium including instructions for a method of profiling software, the method comprising:

- identifying a candidate load instruction in the software;
instrumenting the software to, upon execution, sample a location-value every S
occurrences of the candidate load instruction, wherein S is an integer greater than
1; and
executing the software.
22. (Currently Amended) The machine readable medium of claim 21 wherein instrumenting comprises inserting instructions in the software to count ~~the~~ a number of times ~~each~~ the location-value is encountered.
23. (Currently Amended) A computer-implemented method comprising:
selecting reuse regions within a software program, the selecting including,
~~profiling top~~ periodically sampling set-values for candidate reuse regions to
produce a ~~probability set~~ of top set-values;
storing an occurrence frequency of each of the top set-values into a data structure;
and
selecting the reuse regions as a function of the ~~probability~~ occurrence frequency
of the top set-values.
24. (Currently Amended) The computer-implemented method of claim 23, wherein sampling
the set values includes, ~~profiling top set-values comprises~~:
representing each ~~top~~ set-value as a single value; and
accessing a data structure as a function of the single value to modify a profile indicator.
25. (Original) The computer-implemented method of claim 24 wherein accessing a data structure comprises accessing a data structure at least as large as a number of expected reuse instances.
26. (Currently Amended) The computer-implemented method of claim ~~[[25]]~~ 23, wherein selecting the reuse regions further includes ~~comprises~~ marking as reuse regions those candidate reuse regions having a finite number of ~~top~~ set-values that have a probability of occurrence greater than a threshold.

27. (Currently Amended) A machine readable medium including instructions for a method of selecting reuse regions within a software program, the method comprising:
~~profiling top~~ periodically sampling set-values for candidate reuse regions to produce a ~~probability~~ set of top set-values, wherein the ~~profiling~~ sampling occurs during execution of the software program; and
selecting reuse regions as a function of the ~~probability~~ occurrence probabilities of the top set-values.
28. (Currently Amended) The machine readable medium of claim 27, wherein ~~profiling~~ sampling the set-values comprises: includes,
representing each ~~top~~ set-value as a single value; and
accessing a data structure as a function of the single value to modify a profile indicator.
29. (Previously Presented) The machine-readable medium of claim 27 further comprising:
identifying a candidate load instruction within the candidate reuse region; and
instrumenting the software to profile location-values for the candidate load instruction.
30. (Currently Amended) A computer-implemented method comprising:
identifying a candidate reuse region of a software program;
determining an input set for the candidate reuse region, wherein the input set comprises a plurality of input registers;
instrumenting the software program to, when executed, ~~profile sample~~ set-values for the input set, wherein each set-value comprises an input register value for each of the plurality of input registers, wherein during the execution, the sampling is performed every S occurrences of the set-values, wherein the sampling is not performed for every occurrence of the set-values, and wherein the instrumenting includes,
inserting instructions to combine each of the input register values into a single value; and
executing the instrumented software.

31. (Previously Presented) The computer-implemented method of claim 30 further comprising:
inserting instructions into the software program which when executed will index a data structure of profile indicators using the single value.
32. (Currently Amended) The computer-implemented method of claim 30, wherein combining the register values into a single ~~set~~-value is performed using an exclusive-or operation.
33. (Currently Amended) A computer-implemented method comprising:
sampling a plurality of registers to obtain one of a number of top set-values, wherein the sampling occurs every S occurrences of a candidate reuse region, wherein S is a sampling period, wherein S is a multiple of the number of top set-values, wherein S is greater than 1, and wherein the register values are input values of the candidate reuse region;
determining an occurrence frequency of the register values;
combining the register values into a single set-value; and
storing the occurrence frequency and the single set-value in a data structure.
34. (Previously Presented) The computer-implemented method of claim 33 further comprising:
identifying a group of control equivalent candidate region entries and candidate load instructions;
inserting instructions prior to the group, wherein the instructions set a predicate register every S occurrences; and
inserting profiling instructions at each of the control equivalent candidate region entries and candidate load instructions, wherein the profiling instructions are predicated on the predicate register.
35. (Previously Presented) The computer-implemented method of claim 33, wherein storing comprises:
accessing a record in the data structure as a function of the single set-value; and

- incrementing a profile indicator.
36. (New) The computer-implemented method of claim 16, wherein S is chosen so that a statistically valid number of location-values are sampled.
37. (New) The machine readable medium of claim 9, wherein the periodic sampling includes sampling the set-value every S occurrences of the set-values.
38. (New) The machine readable medium of claim 9 further comprising selecting, based on the tracked number of times the set-value is encountered, the candidate reuse region as a computation reuse region.
39. (New) An apparatus comprising:
input registers to store input values of one of a set of candidate reuse regions of a software program; and
a profiling mechanism to select a computation reuse region from the set of candidate reuse regions, wherein the selecting includes instrumenting the software program to, when executed, obtain the values of the input registers every S occurrences of the one of the set of candidate reuse regions, wherein S is an integer greater than 1, and wherein the computation reuse region is selected based on an occurrence frequency of the obtained values of the input registers.
40. (New) The apparatus of claim 39, wherein the selecting also includes combining each of the input register values into a single value.
41. (New) The apparatus of claim 40, wherein the combining includes folding each of the input register values to create folded values and concatenating the folded values.